EXHIBIT A

UNITED STATES DISTRICT COURT

DISTRICT OF NEW HAMPSHIRE

IN RE DIAL COMPLETE MARKETING AND SALES PRACTICES LITIGATION

Case No. 11-md-2263-SM

EXPERT REPORT OF

STEFAN BOEDEKER

June 20, 2016

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1 Qualifications

1. I am a Statistician and an Economist. I received a Bachelor of Science degree in Statistics and a Bachelors of Arts degree in Business Administration from the University of Dortmund/Germany in 1988. I received a Master of Science degree in Statistics from the University of Dortmund/Germany in 1988, and I received a Masters of Arts degree in Economics from the University of California, San Diego in 1992. I also finished Ph.D. requirements (except dissertation) in Economics at the University of California, San Diego.

2. I am currently employed as a Managing Director at the Berkeley Research Group ("BRG") in one of their Los Angeles area offices at 550 South Hope Street, Suite 2150, Los Angeles, CA, 90071. Prior to joining BRG, I was a Partner at Resolution Economics. I also held Managing Director positions at Alvarez & Marsal, Navigant Consulting, and LECG. I also held partner-level positions at Deloitte & Touche LLP,

PricewaterhouseCoopers LLP, and Arthur Andersen LLP. At the three latter firms, I was responsible for the Economic and Statistical consulting group on the West Coast. Before moving to the United States to attend graduate school, I worked as a statistician for the German Government for three years, from 1986 to 1989.

3. For over 25 years, my work has focused on the application of economic, statistical, and financial models to a variety of areas, such as providing solutions to business problems, supporting complex litigation in a consulting and expert witness role, and conducting economic impact studies in a large variety of industries including, but not limited to, healthcare, retail, technology, entertainment, manufacturing, automotive, energy and utilities, hospitality, and federal, state, and local government agencies.

4. I have extensive experience designing and conducting surveys as well as statistically analyzing survey results in both the litigation context as a consultant and/or designated expert and the non-litigation context as a statistical or economic consultant. I have issued numerous expert reports and rebuttal reports dealing with surveys and statistical sampling related issues. On numerous occasions I have been deposed and I have testified in court regarding survey and statistical sampling-related issues.

5. All of the facts and circumstances set forth in this report are known to me personally and I am prepared to testify to them if called to do so. My curriculum vitae which includes matters in which I have testified is attached to this report as Exhibit A. BRG is compensated for its work on this matter based on an agreed upon hourly billing rate schedule. My hourly billing rate for professional services related to this case is $650 and the billing rates of BRG staff supporting me on this engagement range from $150 to $490. BRG's payment in this matter is not contingent upon the outcome of this litigation.

2 Background and Assignment

6. It is my understanding that The Dial Corporation ("Dial") is alleged to have "deceptively and misleadingly marketed its Dial Complete branded soaps"[1] with respect to its claim that the product kills 99.99% of germs. It is further my understanding that there is no scientific evidence to substantiate the claims made by Dial about Dial Complete killing 99.99% of germs. It is further my understanding that Plaintiffs allege Dial's "kills 99.99% of germs" claim is literally false. As such, it is my understanding that Plaintiffs allege that they have overpaid for a product that does not provide the promised benefits.[2]

7. I was retained by counsel for Plaintiffs to develop an economic loss model to quantify the damages suffered by the proposed class attributable to the purchase of a product that does not have the attributes as advertised. Specifically, I was retained to develop and perform a market research study to assess the value that relevant customers place on a liquid hand soap product feature – specifically, the claim "kills 99.99% of germs." It is my understanding that Plaintiffs allege the "kills 99.99% of germs" claim is an express claim that only appeared on labels of Dial Complete. I was further asked to use the results of the market research study and other data to develop an econometric/statistical model to estimate class-wide damages suffered by purchasers of Dial Complete products with the false claim due to not receiving the germ-killing feature that they paid for.

8. One could argue that the entirety of the actual purchase price of a Dial Complete product should be fully included in an economic loss model because the purchasers of a product with a false claim did not receive what was advertised and what they intended to purchase. However, in my analysis, I take into account that consumers may still have obtained some value from Dial Complete even though it did not provide the 99.99% germ-killing feature claimed on the product's label, and that, therefore, the economic

[1] Consolidated Amended Class Action Complaint, 1/23/12, paragraph 1.

[2] Consolidated Amended Class Action Complaint, 1/23/12, paragraphs 5-8.

loss to the purchaser may have been less than the entirety of the purchase price of the product.

9. The remainder of this report is structured as follows: Section 3 lists the materials I considered in preparing this report. Section 4 gives an overview of the market for liquid hand soaps. Section 5 describes the methodology utilized starting with the derivation of an economic loss model based on supply, demand, price setting mechanisms, and the relationship between prices and a consumer's willingness-to-pay for a product or features of a product. In Section 5, I will also introduce Choice Based Conjoint Analysis as a tool to quantify the impact of changing market conditions on consumers' choices and willingness-to-pay. Section 6 contains a detailed description of the conjoint study that I performed. Section 7 summarizes the results of the conjoint analysis. In Section 8, I present the results from applying advanced statistical estimation techniques to obtain economic losses suffered by the members of the proposed class based on the results from the conjoint study. Lastly, Section 9 summarizes the economic loss estimation and concludes that it is possible to quantify class-wide economic losses given the proposed methodology and the results from an actual conjoint study.

3 Materials Considered

10. In forming my opinions for this report, I have considered the following materials:

    a. Consolidated Amended Class Action Complaint, dated January 23, 2012.
    b. Plaintiffs' Memorandum of Law In Support of Their Motion for Class Certification
    c. Expert Report Prepared by John F. Burke, Jr., Ph.D. and Harvey S. Rosen, Ph.D.
    d. Dial's Opposition to Plaintiffs' Motion for Class Certification
    e. Expert Report of Keith R. Ugone, Ph.D.
    f. Plaintiffs' Reply Memorandum in Support of Their Motion for Class Certification
    g. Rebuttal Expert Report of Harvey S. Rosen, Ph.D. and John F. Burke, Ph.D.
    h. Dial's Sur-Reply in Opposition to Plaintiffs' Motion for Class Certification
    i. Transcript of Deposition of Harvey S. Rosen, Ph.D.

j. Transcript of Deposition of Keith R. Ugone, Ph.D.
k. Mintel's Soap, Bath and Shower Products – US – February 2015.

11. In addition, I have considered all materials cited in the text and in the footnotes to this report and the results of the survey conducted by Amplitude Research described further below and which are being produced with this report.

4 The Market for Liquid Hand Soap

12. The manufacturing of soap products is dominated by a small number of conglomerates, which offer the products in the market place under multiple brand names. Several smaller, independent manufacturers are making headway into the market. Boutique private brands have a strong foothold in the market, but remain bit players.[3] Of the large conglomerates, Colgate-Palmolive's Softsoap brand leads the liquid hand soap segment. Henkel's Dial has been gaining market share as a primary competitor.

13. As a tool to differentiate their products in a crowded marketplace, manufacturers have expanded the features included in their products including but not limited to and in no particular order:

a. deodorizing properties,
b. special fragrances,
c. the inclusion of essential oils,
d. antibacterial properties such as germ killing,
e. eco-friendly processing or packaging,
f. moisturizing properties,
g. skin condition specific attributes such as ultra-gentle or medicated, and
h. special ingredients such as plant stem cells or charcoal.

14. The market for soap products is mature with a high degree of penetration by many competitors as well as broad consumer usage. The market size is forecasted to grow at a

[3] Mintel's Soap, Bath and Shower Products – US – February 2015: Leading Companies, page 1.

steady rate as the population grows. Among personal households, the usage rate for soap, bath, and shower products is a near universal 98%.[4]

15. The primary driver for consumer decision-making is price. 83% of consumers stated price was an important purchasing factor when buying soap, bath or shower products.[5] Consumers tend to stockpile soap products that are on sale and buy the least expensive item possible when shopping.[6] However, opportunities do exist to increase the appeal of premium products. Design, functionality, and seasonal fragrances have been shown to influence decision-making for consumers. There is a clear added-value to these and other categories for marketers and manufacturers to rely on to drive sales of their products.

16. Consumers have shown interest in new product claims and attributes. Of these various claims and attributes, Mintel's research shows that 77% of users expressed interest in deodorizing properties, 73% expressed interest in products marketed as "ultra-gentle", 70% expressed interest in moisturizing effects, and 71% expressed interest in products with antibacterial properties.[7]

17. Given that all soap products have the same purpose (i.e., personal hygiene), manufacturers and marketers have to find alternative ways to compete for consumer dollars. Current trends in soap marketing include creating new product lines with value-added skincare benefits, targeting specific demographics (gender, age, multicultural, families with children, etc.), touting their ease-of-use features, and/or highlighting an eco-friendly product and package.[8]

18. Examples of value-added skincare benefits include moisturizing effects, "essential oils" and fragrances, and anti-bacterial properties. Companies target specific demographics through research showing consumer preferences among gender, age, marital status, children in the household, and race/ethnicity. For example, younger users are more

[4] Mintel's Soap, Bath and Shower Products – US – February 2015: Product Usage, pg 1.
[5] Mintel's Soap, Bath and Shower Products – US – March 2013
[6] Mintel's Soap, Bath and Shower Products – US – February 2015: Liquid Hand Soap and Hand Sanitizer Usage Behaviors, pg 1.
[7] Mintel's Soap, Bath and Shower Products – US – February 2015: Infographic Overview
[8] Mintel's Soap, Bath and Shower Products – US – February 2015: Innovations and Innovators, pgs. 1-4.

likely to use multiple products[9] and Asian buyers are more receptive to new product attributes and benefits.[10] Ease-of-use features include foaming pumps that reduce the time needed to properly lather and "all-in-one" products like shower gels that double as shampoo.

19. The majority of liquid hand soap retail sales (67.5%) take place at supercenters, warehouse clubs, beauty specialist stores, discount stores, and online retailers. The second-largest share of retail sales (21.4%) comes from supermarkets. The strongest growth in sales between 2012 and 2014 (6.1%) came from drug stores.

20. The available data reflects consumers' value-driven purchasing model, as supermarkets, warehouse clubs, and online retailers offer lower prices and the opportunity to shop for other household products. Beauty specialist stores such as Bath & Body Works offer premium products and the ability to sample products in-store.

21. Drug stores tend to be higher-priced than mass merchandisers and supercenters, which seems to counter the value-driven purchasing model. However, research has shown that 40% of drug store shoppers are influenced by the sales and special offers offered by drug stores, which fits the value-driven model.[11]

22. I performed an online and in-store survey of liquid hand soap products for stores such as Walmart, Target, Walgreens, CVS, Rite Aid, K-Mart, and Home Depot, and online stores Drugstore.com and Amazon. My survey yielded data for a total of 376 different hand soap items. Data were collected and tabulated by store, brand, volume, and features such as foaming and non-foaming, moisturizing properties, refill or individual bottles, and whether or not it contained antibacterial properties.

23. The data collected indicates that there is a price premium for added-value attributes such as antibacterial properties of the liquid hand soap and foaming action in the product packaging. A summary of the findings is as follows:

[9] Mintel's Soap, Bath and Shower Products – US – February 2015: Usage Behaviors, pg 4.
[10] Mintel's Soap, Bath and Shower Products – US – February 2015: Race and Hispanic Origin, pg 6.
[11] Mintel'he Drug Store Shopper – US – January 2014

a. The average price for all foaming and non-foaming antibacterial liquid hand soaps in the 7.5-ounce size was $2.18. The high price was $3.49; the low price was $0.88. The count was 43.
b. The average price for all foaming and non-foaming non-antibacterial liquid hand soaps in the 7.5-ounce size was $1.99. The high price was $4.99; the low price was $0.88. The count was 34.
c. The average price for all foaming antibacterial liquid hand soaps in the 7.5-ounce size was $2.44. The high price was $3.49; the low price was $1.50. The count was 22.
d. The average price for all non-foaming antibacterial liquid hand soaps in the 7.5-ounce size was $1.90. The high price was $2.79; the low price was $0.88. The count was 21.
e. The average price for all non-foaming non-antibacterial liquid hand soaps in the 7.5 ounce size was $1.99. The high price was $4.99; the low price was $0.88. The count was 34.
f. No products were recorded in the foaming, non-antibacterial 7.5-ounce size. These products were found in 10 ounce sizes, often made by smaller manufacturer Method.

24. The data collected also indicated that products were frequently sold under the same brand, with the same attributes, at the same prices, with the only difference being a different fragrance, color, or scent. Examples include Walgreens Softsoap at the $2.29 price point. In contrast to this strategy, there were also numerous examples where the same product with the same attributes was sold at different prices at the same store, with the only difference being a fragrance, color, or scent. Examples include Target Softsoap Hand Soap in Cherry Blossom, priced at $1.99 and Target Softsoap Hand Soap in Lavender & Chamomile, priced at $2.69.

25. This indicates that manufacturers follow different strategies of labelling and pricing of liquid hand soap products to maximize sales, revenue, and ultimately profits by marketing their products to specific customer segments relative to the perceived preferences of these segments.

5 Overview of Methodology

5.1 Price Setting in a Competitive Market

26. In order to develop a measure of economic losses to the proposed class caused by the purchase of liquid hand soap products that claim to provide – but do not actually provide – a 99.99% germ-killing feature, I will describe in basic economic terms and using a generic example how prices are set for heterogeneous products and how damages and the appropriate compensation can be determined.

27. For now, let's assume that it is known how much benefit or utility[12] each consumer in a given market derives from a product or service and that the utility can be expressed in monetary terms. The highest price a customer is willing to pay for the product will be equal to the utility derived from the product. The consumer will purchase the product if the price is lower than or equal to the utility but he will not purchase the product if the price is higher than the utility. In economics, this price point is referred to as the willingness-to-pay.

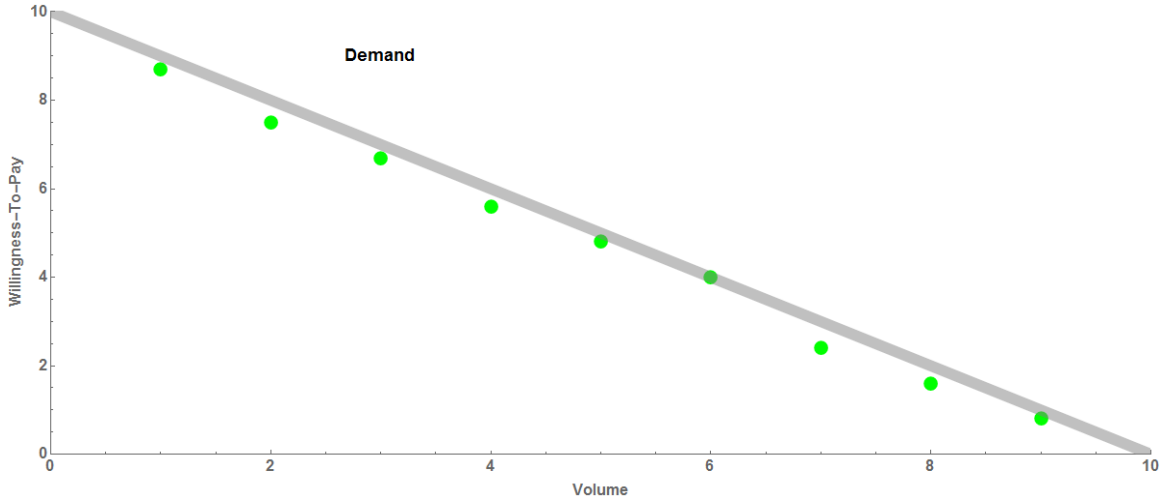
28. With this knowledge, it is now possible to rank the consumers by their willingness-to-pay. Let's assume that the consumer with the highest willingness-to-pay is willing to spend $9 for the product. If the price of the product were $9, this consumer would purchase the product but nobody else would. Let's now assume that the consumer with the next highest willingness-to-pay would be willing to pay $7.50. At $7.50, this consumer and the consumer with a willingness-to-pay of $9 would purchase, and so forth. Were the price to fall to $0, all consumers in the market for that product would be willing to purchase the product.

29. Based on the ranking of consumers by their willingness-to-pay, a demand curve can be constructed in the following way: In a diagram that depicts the amount of the willingness-to-pay for each individual consumer on the vertical axis and the number of

[12] In economics, "utility" is a measure of the value or usefulness of a good or service to a consumer. "Utility is seen only as a way to describe preferences." (Hal Varian, Intermediate Microeconomics, 8th Edition, p. 54.)

consumers on the horizontal axis, the demand curve will begin in the top left corner at the intersection of one consumer and a willingness-to-pay of $9. The next data point is at the intersection of two consumers and a willingness-to-pay of $7.50. The demand curve intersects with the horizontal axis (i.e., zero dollars for the product where all consumers in the market would buy) at the number of consumers in the market for that product. This demand curve would look like a downward facing set of stairs. For simplicity, textbooks typically stylize the demand curve as a smooth downward sloping line or curve. Figure 1 below illustrates this concept.

Figure 1: Willingness-to-Pay and Demand

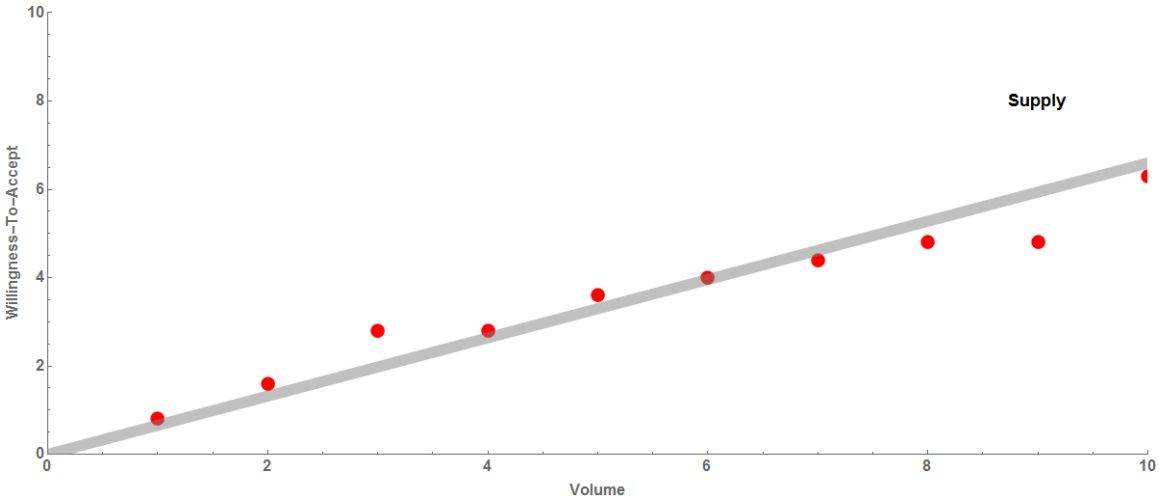


30. Similar to the demand side, we can determine for each manufacturer the minimum price at which they are willing to sell the product. This is called the willingness-to-accept. In a simplified textbook analysis we assume that the willingness-to-accept is equal to the marginal cost of the manufacturer. The marginal cost is the cost the manufacturer incurred when producing the last or marginal unit of the product.

31. Similar to the consumers on the demand side, the manufacturers can be ranked by their willingness-to-accept. In a diagram with volume on the horizontal axis and prices and willingness-to-pay on the vertical axis, the manufacturer with the smallest marginal costs, say $1, will be positioned on the left. If the price of the product were to be just above $1, only this manufacturer would be willing to accept the price. Assuming that the next manufacturer offers one unit for $2, at the price of $2 two units would be

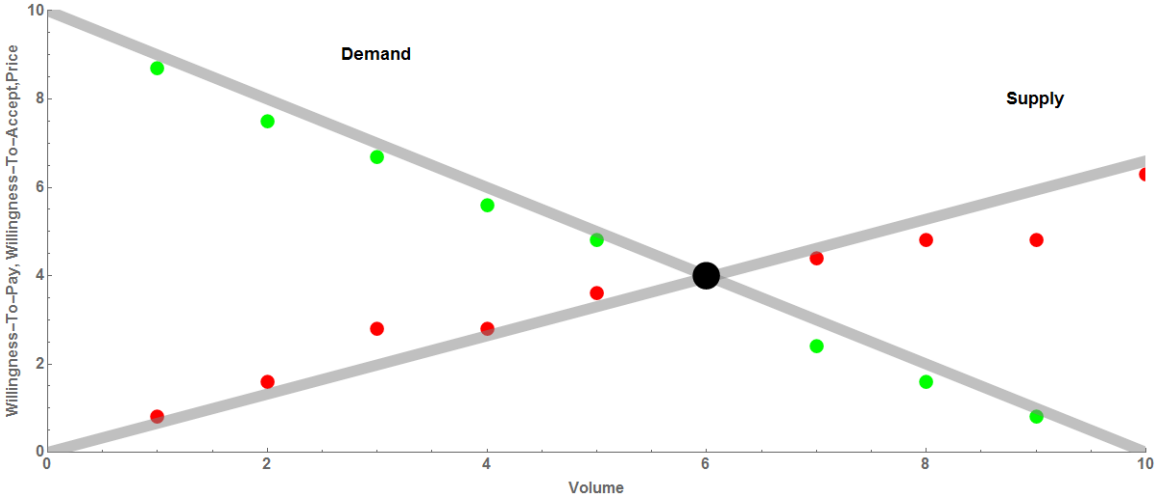
offered in the market. Lining up all manufacturers we get the supply curve. It typically slopes upwards from left to right. Similar to the demand curve, the supply curve would look like an upward facing set of stairs. For simplicity, textbooks stylize the supply curve as an upward sloping smooth line or curve. Figure 2 below illustrates the concept.

Figure 2: Willingness-to-Accept and Supply



32. The market brings together supply and demand. At a price of $1, almost all consumers would purchase the product but only one unit would be offered by the manufacturers. Conversely, at a price of $10, only one consumer would be willing to purchase the product while all manufacturers would be willing to sell the product. The market clears at a price of $4. At this point, most consumers and manufacturers can be brought together. At this price, the supply and demand curves intersect. Would the price exceed $4, more manufacturers would offer their product but fewer consumers would be willing to purchase the product. Would the price drop below $4, more consumers would be willing to purchase the product but fewer manufacturers would be willing to sell the product. For the marginal consumer, the price is equal to the willingness-to-pay; and for the marginal manufacturer, the equilibrium price is equal to the willingness-to-accept.

Figure 3: Supply & Demand



33. It is important to note that the equilibrium price as the intersection point of the supply curve and the demand curve cannot be constructed as the simple average of all consumers' willingness to pay. Rather, the equilibrium price depends on supply and demand. As such, the equilibrium price will typically be lower than the simple average of all individual consumers' willingness to pay.

34. In this case, the claim that a product kills 99.99% of germs is not traded on a market. Rather, it is actually one of many characteristics, parts, and features that together form the product. The equilibrium price-setting mechanism applies to the price of the entire liquid hand soap product, which comprises a set of many characteristics, parts, and features.

5.2 Shifting Demand Curves and Changes in Equilibrium Price

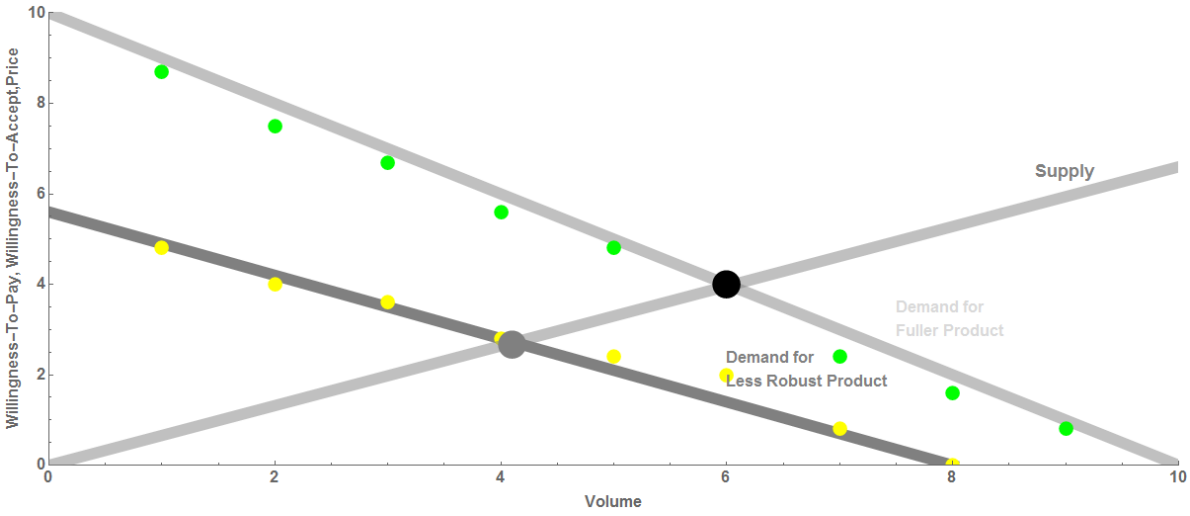
35. Following what is known in Economics as Lancaster utility[13] – the utility a consumer derives from a product, and, therefore, the consumer's willingness-to-pay for the product – is aggregated from the willingness-to-pay for each of the product's characteristics, parts, and features. In this case, the product is liquid hand soap and the characteristics include antibacterial properties, moisturizing quality, and other features.

[13] Lancaster, Kelvin J. (1966). "A New Approach to Consumer Theory". Journal of Political Economy 74 (2): 132–157

36. The overall equilibrium willingness-to-pay of consumers for the entire liquid hand soap product is equal to the weighted sum of the willingness-to-pay the consumer expresses for all of the individual attributes. Changes in the composition of the attributes lead to a shift of the demand curve. Figure 4 below illustrates a market in a world with perfect information ("perfect world"),
    a. Where one of the claims of the product is false, and
    b. Where the consumers know about this false claim at the point of purchase.

37. Consumers are willing to pay less for the product with the false claim, although the drop in willingness-to-pay can vary between consumers. The consumers are ranked again according to their willingness-to-pay, resulting in the yellow dots which define the new demand curve. The new demand curve might have a different shape than the demand curve for the product without the false claim. All else equal, the shift of the demand curve results in a new market equilibrium, where the price and the transaction volume are lower. This is the market equilibrium in the "perfect world," where consumers would have known of the false claim at the time of purchase.

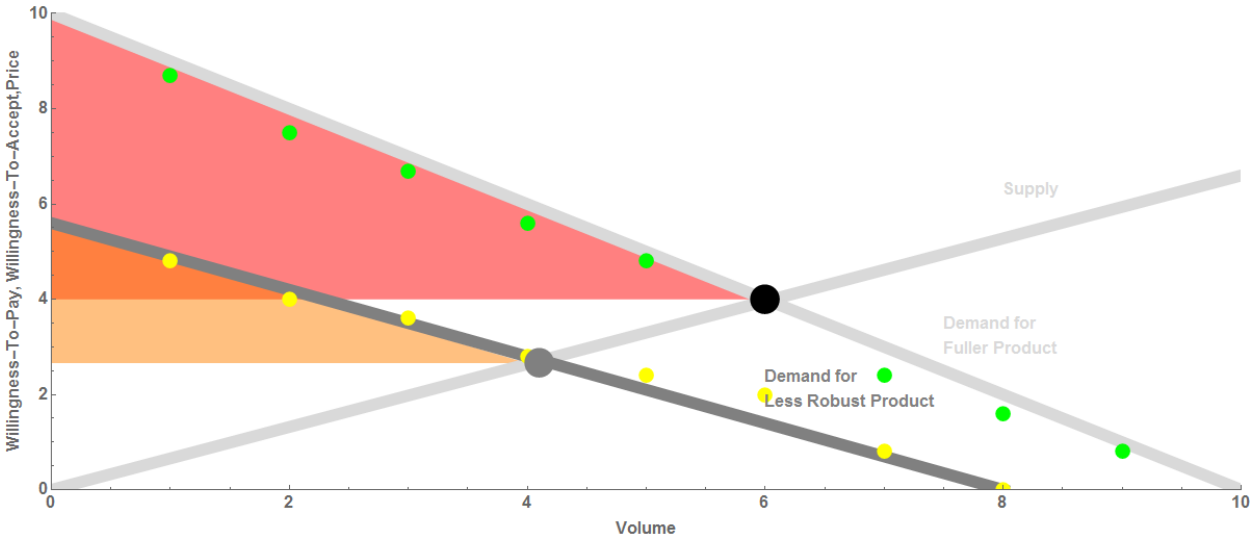
Figure 4: Shift in the Demand Curve and the Effect of the Equilibrium Price



38. In this case, the claim in question is Dial's representation that its Dial Complete product kills 99.99% of germs. The disclosure or revelation of the fact that that claim is false will shift the demand curve and lead to a lower equilibrium price.

39. In order to assess the price paid in the perfect world,[14] it is important to determine the demand curve for the product had the consumers known about the false claim. This concept allows economists to quantify whether consumers still derive some utility from the product even if the "kills 99.99% of germs" claim is false. The following Figure 5 illustrates how this concept can be used to quantify if consumers who bought the product suffered an economic loss:

Figure 5: Consumer Welfare for Product With and Without a False/Misleading Claim



40. The net benefit to each consumer purchasing a given product is the difference between the willingness-to-pay and the price actually paid. Aggregated across all consumers in a market, the net benefit to all consumers (consumer welfare) is equal to the area under the demand curve and above the price line (red area and dark orange area in Figure 5). If the claim about the product is known to be false at the point of purchase, the demand curve will shift downwards (dark grey line in Figure 5). The new consumer welfare after the shift in the demand curve due to the false claim is equal to the area under the new demand curve and above the new price line (light orange and dark orange areas in Figure 5). Since the demand curve for the product with the known-to-be-false claim is

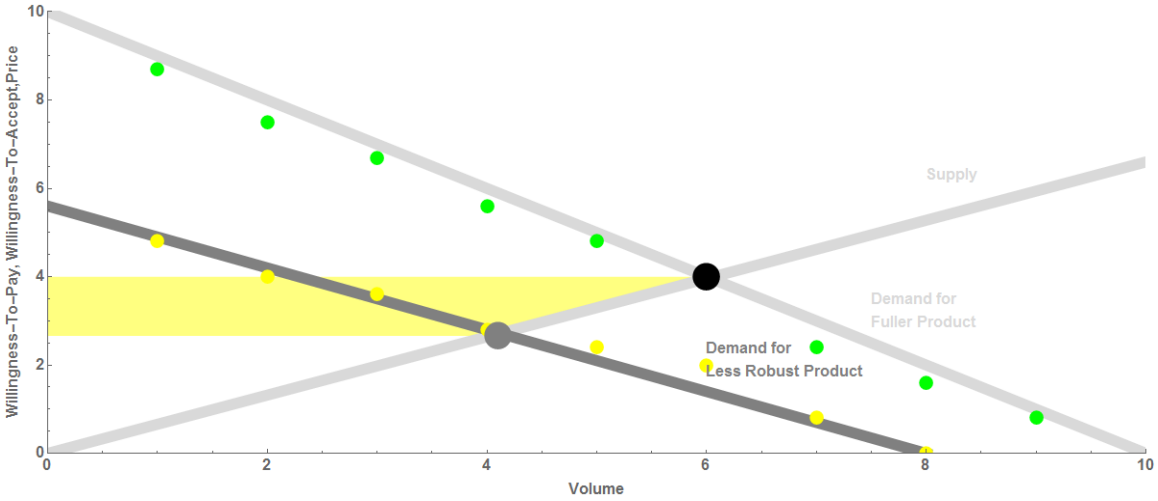
[14] To recall, the perfect world is the world where consumers know about the defect at the point of purchase.

below the demand curve for the product absent a false claim, the consumer welfare for the product with the known-to-be-false claim is generally smaller than the consumer welfare of the product absent a false claim. Therefore, the consumers will have suffered economic losses.

41. Another way of looking at the economic loss focuses on the manufacturer. Generally, a manufacturer's welfare is the difference between the willingness-to-accept and the price obtained in the market. Aggregated over all manufacturers, the manufacturers' welfare is the area below the price line and above the supply curve.

42. In Figure 6 below, the difference in manufacturers' welfare between the product with the false claim and the product without the false claim is depicted by the yellow area. Recall that the equilibrium between supply and the demand for the product without the false claim was that six consumers would have paid $4. In the example depicted in Figure 6, for the product with the false claim, four consumers would have paid $2.60 instead of $4 for the product with the false claim when the claim was known to be false at the point of purchase. In addition, two consumers who actually purchased the product would not have purchased the product with the false claim. The yellow area depicts the additional manufacturers' welfare obtained by not disclosing that the claim was false.

Figure 6: Difference in the Manufacturers' Welfare Between Producing the Product With and Without the False/Misleading Claim



5.3 A Model of Economic Loss

43. The economic theory discussed above can be used to quantify the loss of utility experienced by consumers who purchased a product with a false claim that was not disclosed at the point of purchase.

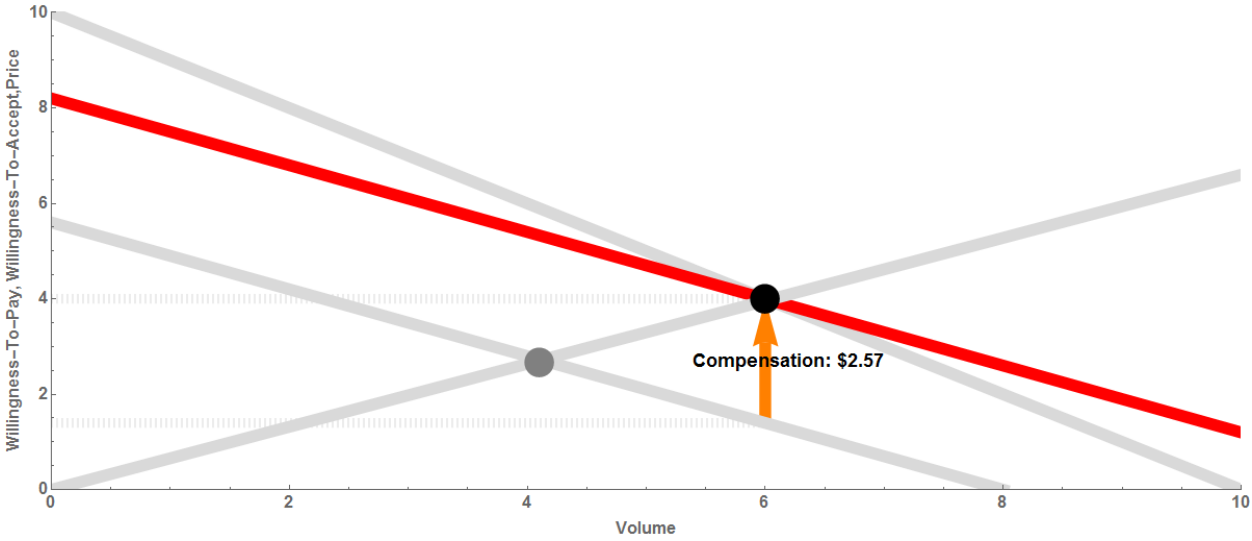
44. To make the consumers whole for the economic losses, every consumer would have to receive an additional payment sufficiently large to vertically shift the demand curve so that the demand curve for the product with the false claim plus additional compensation intersected with the supply curve in equilibrium for the product without the false claim.

45. In order to determine how much the demand curve would need to be shifted, we need to focus on the marginal consumer in the market for the product without the false claim and compare the price she had paid to the price she would have paid for the product with the known-to-be-false claim at the point of purchase.

46. The compensation to make the marginal consumer whole after purchasing the product with the false claim is not simply the difference between the equilibrium prices on the demand curve for the product without the false claim and the demand curve for the product with the known-to-be-false claim (Figure 7). Rather, the compensation of the marginal consumer needs to be equal to the difference between the price this marginal consumer would have paid for the product with the known-to-be-false claim and the product without the false claim.

47. In the example illustrated in Figure 7 below, the marginal consumer actually paid $4 for the product before becoming aware of the false claim, but would have only paid $1.43 for the product with the false claim. The difference in willingness-to-pay is $2.57 ($4 minus $1.43). All else equal and depending on the shape of the demand and supply curves, the compensation could be greater or smaller than the difference between the equilibrium prices.

Figure 7: Compensation Required to Make Consumers Whole After Purchasing Product with False/Misleading Claim



5.4 Approaches to Estimating the Value of Individual Attributes in Composite Products

48. In general, there are two classes of approach to estimate the values of the individual characteristics, parts, and features that together form a composite product when there is no direct market for the individual characteristics, parts, and features (also known as attributes; price is also an attribute of a product) themselves:
    a. Revealed Preference based, and
    b. Stated Preference based.

49. Revealed Preference based approaches observe actual purchases by consumers or published prices and infer from that information the decomposition of the overall price of the composite product into its constituent attributes. This will most often be accomplished by using hedonic pricing models where the actual transaction prices of the composite product with varying attributes is regressed on the specifications of the composite product. The regression coefficients are then interpreted as the implicit market prices of each attribute.

50. The proper use of hedonic pricing models applied to liquid hand soap requires that all attributes of the composite good can be observed and that there is variation in each attribute. For example, if all liquid hand soap products include moisturizers, then hedonic pricing models cannot be used to estimate the implicit price of moisturizers. In

the case of the Dial Complete product with a false claim of killing 99.99% of germs, the hedonic approach is not suited to estimate the potential economic loss to the consumer because, in the original sales transactions, all Dial Complete products include the "kills 99.99% of germs" claim and the original sales transaction data does not differentiate between the features "correctly claims to kill 99.99% of germs" and "falsely claims to kill 99.99% of germs."

51. Stated Preference based approaches involve asking individuals how much they value a particular product. This is done by investigating how much they would be willing to pay for a particular attribute/feature in a composite product. In this context, Conjoint Analysis is an approach exploring respondents' preferences over multiple sets of choices, which produces rich data sets and numerous data points from which to estimate the value of the attribute/feature of interest. Conjoint Analysis is conducted in a survey setting where demographic, socio-economic, and general decision-making processes and preference information about the product in question will be obtained and integrated into the estimation process.

52. In summary, based on the principles of economics discussed above, I conclude that Conjoint Analysis is the most appropriate approach in this case to estimate the values of the individual attributes and features in question to assess the extent to which the allegedly false claim that Dial Complete kills 99.99% of germs resulted in a loss of utility to the consumers, and thus created economic losses to the members of the proposed class. In the following section, I will give an overview of the methodology of Conjoint Analysis.

5.5 Conjoint Analysis – Overview of Methodology

53. Conjoint Analysis enjoys wide use in market research and is discussed in depth in the market research literature.[15] Over 14,000 commercial applications of Conjoint Analysis

[15] *See*, for example: Rao, Vithala, Applied Conjoint Analysis, Springer Verlag, 2014.

are estimated to take place each year.[16] General Motors has been employing Conjoint Analysis for 40 years to evaluate consumer preference for broad attributes such as fuel economy and quality, more specific attributes such as satellite radio, and even entire vehicle lines, such as the Chevy Avalanche.[17]

54. Vithala Rao's book, Applied Conjoint Analysis, gives numerous examples of the widespread use of Conjoint Analysis including but not limited to several high-profile applications by large corporations and large public agencies such as (i) Microsoft for pricing newly released software products, (ii) Proctor & Gamble for consumer-goods pricing and new product development, (iii) Marriott Corporation for the development of the Courtyard hotel brand, and (iv) T-Mobile for developing optimal cellular plans. Conjoint Analysis was also integral to the development of the EZPass electronic toll collection system by regional transit agencies in New York and New Jersey in the 1990s.[18]

55. The general idea behind Conjoint Analysis is that consumers' preferences for a particular product are driven by features or descriptions of features embodied in that product.

56. Conjoint Analysis is a set of econometric and statistical techniques that have been developed to study consumers' decision-making processes, determining trade-offs between products, features, and price, as well as quantifying consumers' gains and/or losses of utility when choosing between different alternatives.

[16] Orme, Bryan K, Getting Started with Conjoint Analysis: Strategies for Pricing Research, 2nd ed., Madison: Research Publishers, 2005.

[17] *Ibid*.

[18] Rao, Vithala, Applied Conjoint Analysis, Springer Verlag, 2014. Vithala R. Rao is the Deane Malott Professor of Management and Professor of Marketing and Quantitative Methods, Samuel Curtis Johnson Graduate School of Management, Cornell University, Ithaca, New York. He has 125 publications on several topics including Conjoint Analysis and multidimensional scaling, pricing, bundle design, brand equity, market structure, corporate acquisition, and linking branding strategies to financial performance.

57. By simulating real world and/or hypothetical choices between product features and prices, Conjoint Analysis is ideally suited to model the impact of different choice scenarios on a consumer's utility function.

58. The data required for a Conjoint Analysis is collected in the setting of a survey where survey participants are shown product profiles with different levels of each attribute. For example, the inclusion of moisturizers in liquid hand soap is an attribute and "yes" and "no" are levels of the attribute (*i.e.*, the soap either contains or does not contain moisturizers). The survey participants are consumers who currently are or recently have been in the market for the product of interest. After reviewing a set of choice menus of product attributes and their levels, survey participants are then asked to indicate their preferences for these profiles. The product profiles include choice options for different price points for each set of features on the choice menu.

59. After the completion of the survey, the Conjoint Analysis uses data from the survey on the attribute levels of the product profiles shown, and the resulting preferences or choices of respondents, to decompose the respondents' preferences for a product into the partial contribution of these attribute levels ("part-worths") to overall product utility using appropriate statistical methods. The statistical models used in my analysis – Mixed Logit Models and Hierarchical Bayesian Estimation – will be discussed in more detail in Section 6 "Economic Loss Model." These statistical estimation techniques quantify the part-worths for feature levels such that the resulting estimated part-worths best predict respondents' preferences or choices from the survey.

60. The price reduction needed to compensate for the loss of a feature, or the additional price customers would pay for the inclusion of a feature can then be calculated and a variety of choice situations and trade-offs between choices can be modeled and their outcomes can be precisely quantified. The precision, and thus the reliability, of the resulting estimations depends on the number of survey participants. The more respondents who take part in the survey, the more precise the resulting predictions are.

61. For this assignment, I applied a form of Conjoint Analysis known as Choice-Based Conjoint Analysis ("CBC"). In CBC, study participants are shown sets of product

profiles (called "choice sets" or "choice menus"), and are asked to choose the profile that they would prefer to purchase if the choice menu offered would describe the only products that were available. CBC survey methods closely mimic real-world purchase processes.[19] Conjoint Analysis allows for the prediction of the probability that a respondent will choose any product profile that is described by the part-worths and can do so for any competitive set of products.[20] Based on the estimations, it is also possible to simulate how choice shares would change in a market based on a change in overall price. CBC enables us to determine the difference in value (measured in dollars) that customers place on a liquid hand soap that claims it " kills 99.99% of germs" compared to an otherwise identical liquid hand soap that does not claim to "kill 99.99% of germs."

6 Overview of Study Parameters

62. To be included in the Conjoint Analysis, survey respondents are asked a series of demographic questions including gender, age, and region of the country where they reside. These questions are used to ensure that the survey is completed by a demographically diverse set of respondents. Survey respondents are also asked whether they have purchased liquid hand soap; only those who purchased liquid hand soap were allowed to proceed with the survey so that the population of respondents to this survey was similar to purchasers of Dial Complete.

63. After qualifying for the survey,[21] the respondents are asked questions designed to elicit thoughts about liquid hand soap. They are asked where they buy liquid hand soap, which brand or brands they typically buy, and which qualities are important to them when making purchasing decisions (e.g., price, scent, dispenser design, brand, etc.).

[19] Orme, Bryan K, Getting Started with Conjoint Analysis: Strategies for Pricing Research, 2nd ed., Madison: Research Publishers, 2005.

[20] Allenby, Greg M & Peter E Rossi, "Hierarchical Bayes Models," in Grover, Rajiv & Marco Vriens, eds., The Handbook of Marketing Research, Thousand Oaks: Sage Publications, Inc., 2006.

[21] To participate in the survey, respondents must meet all of the following criteria: (1) be at least 18 years old, (2) reside in the United States, and (3) purchased liquid hand soap within the last twelve months.

64. The next section of the survey is comprised of the actual CBC exercise itself. During this exercise, respondents view nine choice sets, each containing a combination of four attributes, plus a price. The attributes are (i) whether the soap contains moisturizers, (ii) the claim that the soap kills 99.99% of germs, (iii) the claim that the soap is antibacterial, and (iv) whether the soap is foaming. The four non-price attributes are binary – the attribute is or is not offered (e.g., it either does or does not contains moisturizers, it either does or does not claim "kills 99.99% of germs," etc.). Respondents were instructed to assume that the products shown do not vary on any attributes other than the four presented. In my study, the prices range from $0.99 to $3.99, with nine price points in all.

65. Each choice set consists of five choices: four with various combinations of product attributes and prices described above, and a fifth "opt-out" choice, indicating dissatisfaction with each of the first four choices[22] resulting in the decision to not purchase any of the options at the prices shown. An example of a choice set is given in Figure 8 below:

Figure 8: Example of a CBC Choice Menu

If you were out shopping and needed liquid hand soap, which one of the following four liquid hand soap products would you purchase, if any, based on the claims on the label and retail price as shown below? Please assume that the four options shown below have all the other features and characteristics (such as brand, scent, color, shape, etc.) that you prefer.

	Moisturizing		Moisturizing		None of these, I would shop somewhere else for better options
			Kills 99.99% of Germs	Kills 99.99% of Germs	
		Antibacterial		Antibacterial	
	Foaming	Foaming			
Price per 7.5 oz. dispenser	$1.39	$2.89	$2.09	$1.75	
Choice:	○	○	○	○	○

[22] See Orme (2005) for an exposition of the advantages of including the opt-out option.

66. With the inclusion of four binary attributes and the nine price points, there are 144 distinct possible choices for the survey participants.[23] The CBC employed in the survey randomly assigns choices from all 144 possibilities with equal likelihood and with uniform frequency of each level of each attribute and each pair of attribute/level permutations. That is, the CBC design is *balanced* and *orthogonal*. Balanced and orthogonal surveys are commonly employed in CBC.[24] The importance of an orthogonal and balanced design lies in the fact that designs of this type are 100% efficient. Efficiency implies that the resulting estimations have the smallest mean squared error out of all possible designs.[25] The mean squared error measures the level of variation and as such, the precision of the resulting estimates. The smaller the mean squared error of an estimate the more precise it is. As such, efficiency of a design is a measure of the information content of a design. Therefore, more efficient designs imply more reliable results.[26] Conversely, as efficiency decreases, the parameter estimates become correlated[27] and the standard errors increase which makes the estimation of individual parameters less reliable.[28]

67. Note that the product attributes included in the conjoint choice task do not include every possible feature of liquid hand soap products. The main purpose of the product

[23] 2x2x2x2x9 = 144

[24] Bakken, David & Curtis L Frazier, "Conjoint Analysis: Understanding Consumer Decision Making," in Grover, Rajiv & Marco Vriens, eds., The Handbook of Marketing Research, Thousand Oaks: Sage Publications, Inc., 2006, Chapter 15.

[25] The mean squared error (MSE) is calculated as the average of the squared distances between the estimator and what is estimated, or the "errors." Efficient designs are ones that minimize the MSE.

[26] The standard error is the standard deviation of the sampling distribution of a statistic. A smaller standard error implies a smaller margin of error, which results in a tighter confidence interval around an estimate.

[27] This is known as multicollinearity. When parameter estimates are correlated, one estimate can be predicted using another estimate. This makes it difficult to understand the impact of individual parameters, as small changes in one predictor can lead to large changes in the dependent variable because the change in the predictor is concurrently causing changes in one or more other predictors. In other words, the predictors are not independent of each other.

[28] Warren F. Kuhfeld, "Construction of Efficient Designs for Discrete Choice Experiments," in Grover, Rajiv & Marco Vriens, eds., The Handbook of Marketing Research, Thousand Oaks: Sage Publications, Inc., 2006, Chapter 16.

attributes included in this study other than the "kills 99.99% of germs" feature is to provide a reasonable and engaging choice task to help disguise the fact that our chief interest is in the respondents' reaction to the claim "kills 99.99% of germs" made by Dial on Dial Complete.[29] Since one of the attributes studied is price, willingness-to-pay estimates can be computed.

68. It is a known phenomenon that choices presented earlier in a list of choices in a questionnaire are disproportionately likely to be selected.[30] This phenomenon is known as order bias. To avoid order bias in my study, attributes were shown in a different order, chosen at random, to each respondent – except for price, which is always shown last.

7 Survey Results

69. During January 2016, I commissioned a survey company called Amplitude Research ("Amplitude") to program and host a questionnaire of my design to understand the behaviors and opinions of consumers who have purchased liquid hand soap within the last twelve months. As described above, a Choice Based Conjoint exercise was included in the survey to help understand the perceived value of several common liquid hand soap attributes/features.

70. Using Amplitude's survey panel, I was able to target a demographically diverse group of respondents. In all, observations from 2,000 respondents were collected. Of the 2,000, approximately 45% are male and 55% are female; a wide range of ages (18 to 65+) and incomes (less than $25,000 to $150,000 or more) are represented; and respondents are spread across the United States.

[29] Similarly, avoiding disclosure of the sponsor of the survey helps avoid altering survey respondents' responses. By disguising both the chief interest of the CBC study and its sponsorship, I avoided introducing bias into survey results.

[30] Krosnick, Jon and Duane Alwin, "An evaluation of a cognitive theory of response order effects in survey measurement," Oxford Journals Social Sciences Public Opinion Quarterly Volume 51, Issue 2, pp. 201-219.

71. The survey includes questions about consumers' behavior when shopping for and purchasing liquid hand soap. The survey results revealed that consumers purchase liquid hand soap from a variety of outlets and purchase many different brands. Approximately 60% of respondents indicated that they purchased a Dial liquid hand soap product within the last twelve months and 19% stated that Dial is the brand of liquid hand soap they purchase most often.

72. *Understand Demand for Optional Features:* The survey also includes questions aimed at better understanding what drives purchasing decisions. The specific features asked about in the survey are: low price, kills 99.99% of germs, antibacterial, foaming, non-foaming, has scent(s) I like, has soap color(s) I like, moisturizing, has dispenser with design/appearance I like, has convenient dispenser size and shape, well-known brand / brand I trust, and gentle on the skin.

73. The responses indicate that a majority of respondents are at least somewhat interested in all of the features mentioned. For example, 1,769 respondents (approximately 88%) said that the availability of scents they like is extremely important, important, or somewhat important and 1,756 (approximately 88%) said that purchasing a well-known brand is at least somewhat important.

74. The survey shows that different consumers have varying preferences when they buy liquid hand soap. However, this is consistent with the economic theory described above. When the market clears at the equilibrium price, varying consumer preferences are taken into account and merged into one price, which is identical for each consumer for the product in question regardless of the fact that an individual consumer subjectively values one attribute over another. Therefore, each consumer who buys a product that does not have the attributes as advertised and is inferior to the product as advertised suffered an economic loss because they paid for an attribute or attributes which the product does not have.

8 Economic Loss Calculation

8.1 General Framework of Economic Loss Model

75. A purchaser of a liquid hand soap product that contains the claim that the product "kills 99.99% of germs" paid for the product with the expectation that it would work as advertised. I applied the following multi-step estimation process to determine the economic loss associated with purchasing a product where the claim "kills 99.99% of germs," although made, turns out to be false:

- Step 1: Quantify the "value" of the true claim, if any, that the product kills 99.99% of germs to the purchaser of a liquid hand soap product compared to the same product without the claim.
- Step 2: Perform extensive market simulations for different price points and different permutations of product features to assess the premium value of the "kills 99.99% of germs" claim to the consumer, if any.
- Step 3: If Step 1 and Step 2 result in a premium value for the feature that the soap "kills 99.99% of germs", then quantify the economic loss to the purchasers on a per unit basis as a percentage of the purchase price.

76. In Step 1, based on the results from all 2,000 individual respondents in the CBC[31], one statistical estimate is calculated to determine the implicit price for the feature that the product kills 99.99% of germs compared to a product that is otherwise identical but does not have the germ killing feature. Just like the equilibrium price in the price setting mechanism described above, this will be one value that takes into account all the individual data points from the study without just simply averaging the individual data points.

77. In Step 2, the estimated utilities from the conjoint analysis will be used to quantify the price premium, if any, for the "kills 99.99% of germs" feature of the product for a variety of price points and permutations of features. More specifically, I computed the

[31] In the CBC study, 2,000 individual respondents each viewed and provided responses for nine choice sets, providing me with 18,000 data points for the analysis.

impact of adding features such as foaming, moisturizing, anti-bacterial, and kills 99.99% of germs to a base product. In addition to the product variation, I also varied the prices for the base products for the comparisons from $0.99 to $2.99 generating price premium computations for over 900 permutations of product features and prices.

78. In Step 3, I calculated the specific price premiums in the following way:

    a. At each new price level, the estimated consumer utilities yield a market share for each product in the comparison. That is, as the price of the premium product changes, the market shares of the basic product and the premium product also change.
    b. As the price increases, fewer consumers find the premium option acceptable. When the cost increase is too high, the proportion of consumers accepting the premium option declines. As the price of the premium product increases, the demand curves for the base product and the product with the premium approach each other.
    c. As the cost of the premium product is further increased, the proportion of consumers choosing that option will eventually fall below the proportion of consumers choosing the basic option. The cost at the intersection of the two curves is the implicit price estimate for the premium feature.

8.2 Statistical Estimation Techniques Applied in Conjoint Analysis

79. The underlying econometric and statistical estimation techniques of the Conjoint Analysis are based on Mixed Logit models and Hierarchical Bayesian Estimation techniques which are widely employed in economics and marketing research to analyze preferences over a discrete set of choices.[32]

[32] Underlying the mixed logit is a model of random utility. Berkeley economics professor Daniel McFadden developed the random utility model in the 1970s while working as a consultant on the design of the Bay Area Rapid Transit (BART) system in California. This work won McFadden the Nobel Prize in 2000. *See* Hal Varian, Intermediate Microeconomics, 8th, 2010, p. 68.

80. Mixed Logit models are based on the idea that each consumer assigns a utility to each choice, and this utility measures the attractiveness of each choice. These utility values are correlated with the attributes of the actual choice (such as adding moisturizers to an otherwise identical product that does not contain moisturizers or including the claim "kills 99.99% of germs" on an otherwise identical product that does not include the "kills 99.99% of germs" claim) and the price associated with that choice. The utilities are also correlated with observable characteristics of the consumers making the choice (such as their age or income).

81. The utility of each product consists of two components – a deterministic component and a random component. The deterministic component can be modeled by observable factors such as socio-economic and demographic characteristics of the consumers, product features, and market conditions. In general terms, the random component summarizes all the unobservable factors in the individual consumer's choice process. In Mixed Logit models, the random component is expressed through a logistic distribution function. Together with the observable factors, this distribution function will be used to predict the probability that a particular choice is made.[33]

82. Once shown a menu of choices of different levels of attributes and different price alternatives, the consumer then chooses the one choice in the menu that yields the highest utility from that particular menu of choices.[34] Observing consumers' choices from various choice menus enables one to estimate the relative value consumers place on one attribute over another.

83. When one of the attributes is price, this allows for the estimation of the value of an attribute relative to price – that is, the dollar value of the willingness-to-pay for that

[33] *See*, for example: Rao, Vithala, Applied Conjoint Analysis, Springer Verlag, 2014, Chapter 4, for a detailed discussion of the use of mixed multinomial logit models in choice based conjoint studies.

[34] *See* Figure 8 above for an example of the actual layout of a choice menu where the respondent was presented a menu with four choices of combinations of features and the choice of "no purchase."

attribute. In fact, the willingness-to-pay for an attribute is the negative ratio of the attribute's coefficient to the price coefficient in the underlying choice model.[35]

84. The "mixed" in a mixed logit model refers to the fact that consumers' utilities for particular choices are correlated both with features of the choice (e.g., which particular characteristics of liquid hand soap are available) and characteristics of the consumer (e.g., her age or income).

85. Bayesian statistics is a subset of statistics where the underlying parameters that need to be estimated are assumed to be random variables rather than fixed quantities. Bayesian modelling is based on assigning prior probability distributions to any unknown parameters. In this case, the unknown parameters to be estimated are the part-worths of the attributes of a composite product derived from the choice sets in the conjoint analysis. These parameters will be estimated by a technique referred to in the literature as Hierarchical Bayesian Estimation.[36]

86. In Hierarchical Bayes Estimation ("HBE"), the parameter estimates are derived in a two-step hierarchical approach. At the higher level, the individual consumers' part-worths are assumed to follow a specified distribution (like multivariate normal distribution or log-normal distribution). At the lower level, it is assumed that the individual consumers' choice probabilities can be described by a particular model, such as a mixed logit model. Initial estimates of part-worth are estimated for each study respondent to use as a starting point. New estimates are updated using an iterative process called "Gibbs Sampling" and "Metropolis Hastings Algorithms."[37] This process is typically repeated thousands of times whereby in each iteration, an estimate is made for each parameter, conditional on current estimates of the others. After many iterations, this process converges to the correct estimates for each of the parameters.

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[35] Train, Kenneth E., "Discrete Choice Methods with Simulations," Cambridge University Press; 2nd edition, 2009. Chapter 12 gives a detailed derivation of the Bayesian approach applied in this report.

[36] *See*, for example: Rao, Vithala, Applied Conjoint Analysis, Springer Verlag, 2014, Chapter 4.11, for a detailed discussion of the use of Hierarchical Bayesian Estimation in choice based conjoint studies.

[37] Rao, Vithala, Applied Conjoint Analysis, Springer Verlag, 2014, p. 168.

87. The HBE method combines random effect specifications at the aggregate level to account for variation across individuals and specific modelling of choice probabilities at the individual level. With market simulations, the performance of competing alternatives can be evaluated.

8.3 Willingness-To-Pay Estimates Based On Conjoint Analysis

88. The estimated willingness-to-pay using this method is the value of obtaining a product that claims it "kills 99.99% of germs" compared to obtaining an otherwise identical product that does not make this claim. **To be clear, this value is *not* an average value that would be different for all class members – rather, it is the value calculated based on consumers' responses to varying choice menus in the Conjoint Analysis designed to derive one numerical figure to value the claim.** The interpretation of this figure is the amount consumers paid when purchasing a liquid hand soap product claiming to kill 99.99% of germs compared to an otherwise identical product without such a claim.

89. To assess the robustness of the willingness-to-pay estimation under a variety of market conditions, I performed a market simulation study using the individual utilities that I estimated from the conjoint study using the Hierarchical Bayesian estimation methodology. In my market simulations, I used the same attributes and levels defined in the conjoint study. The following example illustrates the importance of taking market conditions into account:

90. In an eBay auction, I may have put my eye on an item. I put my upper limit for my bids at $200. This upper limit signals my willingness-to-pay. If, on the other hand, I saw the same item with a "Buy it now" price tag of $100, I would have bought it for $100. What happened in this example? Did my utility from purchasing the item suddenly change? Did my willingness-to-pay change? Obviously not. However, what has changed is that the projected amount that I would pay going through the bidding process is different than the price I will pay when the competing offer is presented to me. In other words, the willingness-to-pay does not necessarily reflect the actual price.

91. As described above I conducted price premium calculations for over 900 permutations of product features and prices as follows:

    a. For a chosen base product with a fixed price, I calculated the change in demand for the premium feature when the prices for the premium feature vary.

    b. Then I calculated the price point at which the demand for the premium feature drops below the demand for the base product because the price premium increase is too high.

    c. In the next step, I then varied the price for the base product and performed the same calculations of the price point where the price of the premium product gets too large such that the consumer no longer chooses the premium product.

    d. The base product of comparison varied from a basic product with no added features to products that contained foaming and/or moisturizing attributes.

92. As the price of the premium product changes, the market shares of the basic product and the premium product also change. As the premium price increases, fewer consumers find the premium option acceptable. When the price increase is too high, the proportion of consumers accepting the premium option declines to the point where the proportion of consumers choosing that option will eventually fall below the proportion of consumers choosing the basic option. The price at the intersection of the two demand curves is the estimate for the price of the premium feature over the base product.[38]

93. If the consumers perceive an additional value for a product that is advertised as "kills 99.99% of germs" over just the advertised "antibacterial" property the individual utilities from the conjoint study will lead to a larger estimate of the premium for the "kills 99.99% of germs". On the other hand, if the consumers are indifferent, the simulations for different price points and base products will not show a statistically significant relationship.

[38] Orme, Bryan K., "Assessing the Monetary Value of Attribute Levels with Conjoint Analysis: Warnings and Suggestions," Sawtooth Software, Inc., 2001.

94. I arrived at 900 price premium calculation permutations by employing six unique simulation methodologies wherein comparisons were made between specific, distinct base-premium product pairings:

    a. Simulation 0 – the base product comparable does not bear any added features or claims, while the premium product features the claim "Antibacterial" or "Kills 99.99% of Germs."

    b. Simulation 1 – the base product comparable features the claim "Moisturizing", while the premium product features the same claim "Moisturizing" in addition to either of the following claims: "Antibacterial", "Kills 99.99% of Germs."

    c. Simulation 2 – the base product comparable features the claim "Foaming", while the premium product features the same claim "Foaming" in addition to either of the following claims: "Antibacterial", "Kills 99.99% of Germs."

    d. Simulation 3 – the base product comparable features the claims "Moisturizing" and "Foaming", while the premium product features the same claims "Moisturizing" and "Foaming" in addition to either of the following claims: "Antibacterial", "Kills 99.99% of Germs."

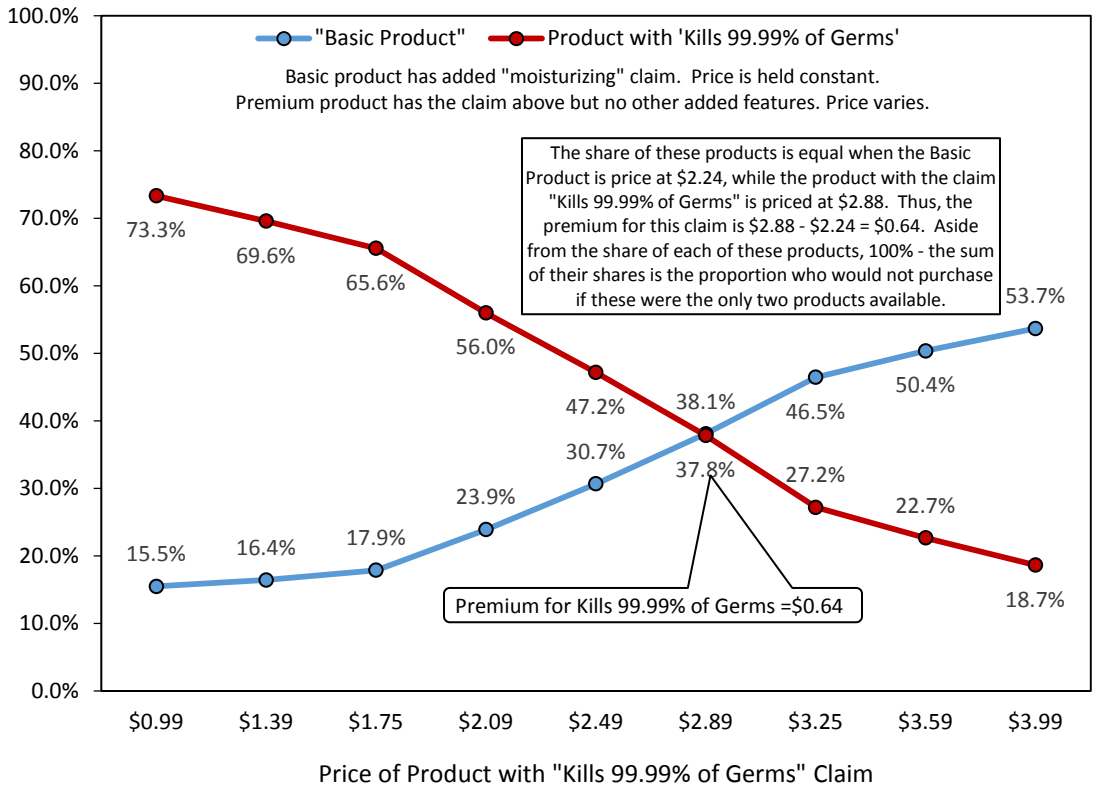
    e. Simulation 4 – the base product comparable features the claim "Moisturizing", while the premium product features the claim "Antibacterial" or "Kills 99.99% of Germs" and has no other added features or claims.

    f. Simulation 5 – the base product comparable features the claim "Foaming", while the premium product features the claim "Antibacterial" or "Kills 99.99% of Germs" and has no other added features or claims.

95. The following Figure 9 illustrates the computation of the premium, if any, for a basic product and the premium product that claims to kill 99.99% of germs – the share of these products is equal when the basic product is priced at $2.24 and the premium product is priced at $2.88. Thus, the premium for this claim, or the willingness-to-pay

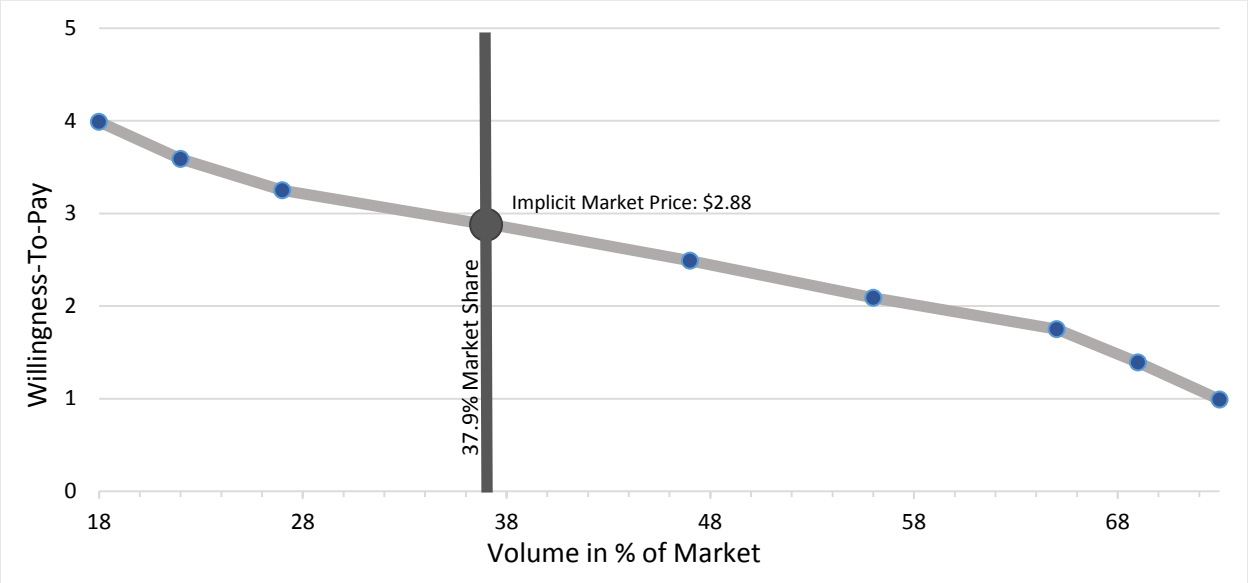
for the claim that a product kills 99.99% of germs compared to a basic product that features the claim "Moisturizing", is equal to $2.88 minus $2.24, or $0.64.

Figure 9: Willingness-To-Pay with Market Simulation (99.99% Germ-Killing Claim, Simulation 4)



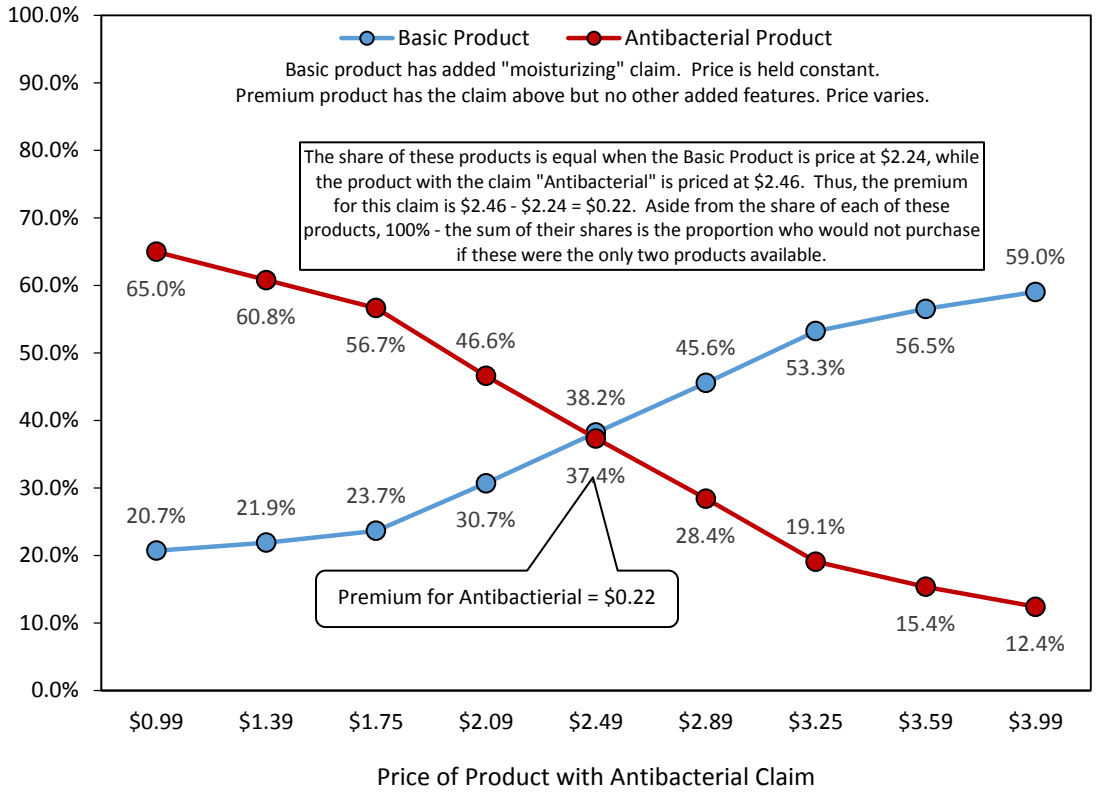
96. Based on the willingness-to-pay estimates, I constructed an implicit demand curve, which resulted in an implicit price of $2.88 for a liquid hand soap product that claims to kill 99.99% of germs. Figure 10 below shows the downward-sloped implicit demand curve for such a product. At the price of $2.8, the market share is equal to 37.9%.

Figure 10: Implicit Demand Curve for Liquid Hand Soap Product with 99.99% Germ-Killing Claim (Simulation 4)



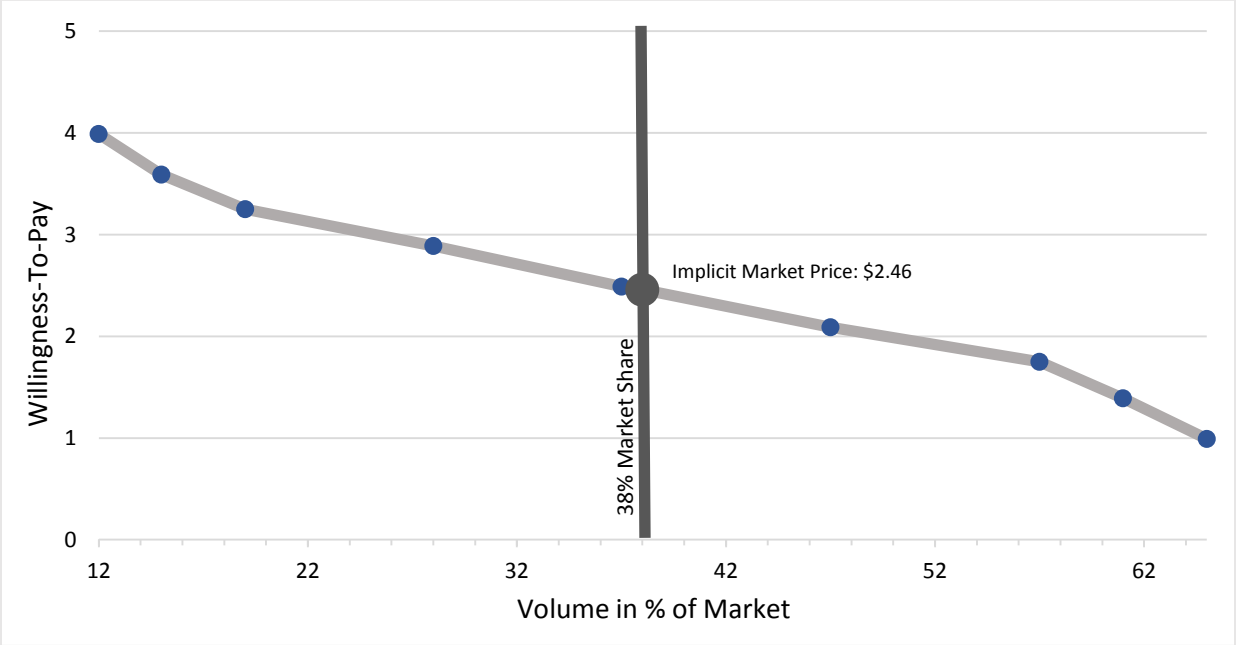
97. The following Figure 11 shows the same calculation with the basic product and the premium product that claims to contain antibacterial qualities – the share of these products is equal when the basic product is priced at $2.24 and the premium product is priced at $2.46. Thus, the premium for this claim, or the willingness-to-pay for the claim that a product contains antibacterial qualities compared to a basic product that features the claim "Moisturizing", is equal to $2.46 minus $2.24, or $0.22. This is further illustrated in Figure 11.

Figure 11: Willingness-To-Pay with Market Simulation (Antibacterial Claim, Simulation 4)



98. Based on the willingness-to-pay estimates, I constructed an implicit demand curve, which resulted in an implicit price of $2.46 for a liquid hand soap product that claims to have antibacterial qualities. Figure 12 below shows the downward-sloped implicit demand curve for such a product. At the price of $2.46, the market share is equal to 37.8%.

Figure 12: Implicit Demand Curve for Liquid Hand Soap Product with Antibacterial Claim (Simulation 4)



99. The difference between the willingness-to-pay values for the 99.99% germ-killing claim and the antibacterial claim is the implicit value that consumers place on the 99.99% germ-killing claim above the antibacterial claim. That is, the willingness-to-pay for the claim that a product kills 99.99% of germs compared to a product that claims to have antibacterial qualities is $2.88 minus $2.46, or $0.42. The following Figure 13 displays the shift in the demand curve and the resulting drop in the equilibrium implicit price.

Figure 13: Shift in Demand Curve and Drop in Equilibrium Implicit Price When Comparing Product with 99.99% Germ-Killing Claim to Product with Antibacterial Claim (Simulation 4)

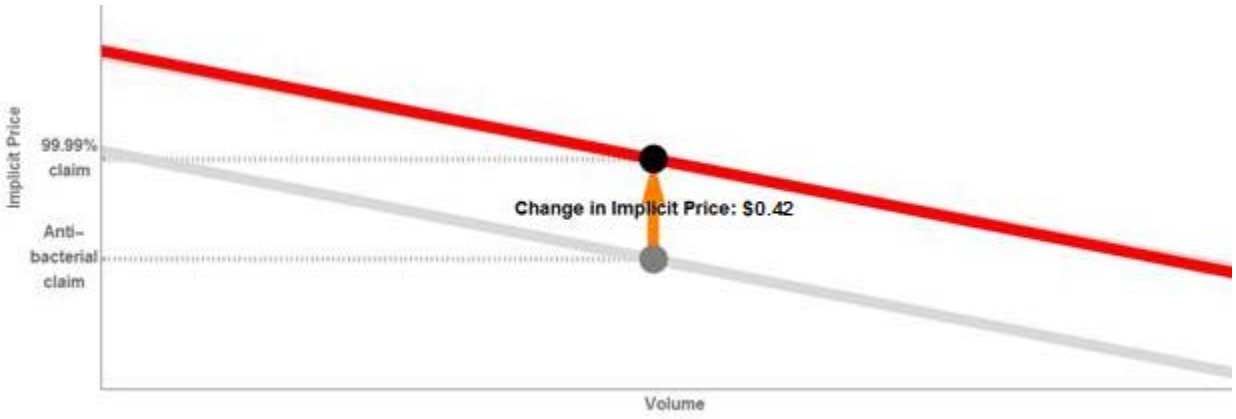
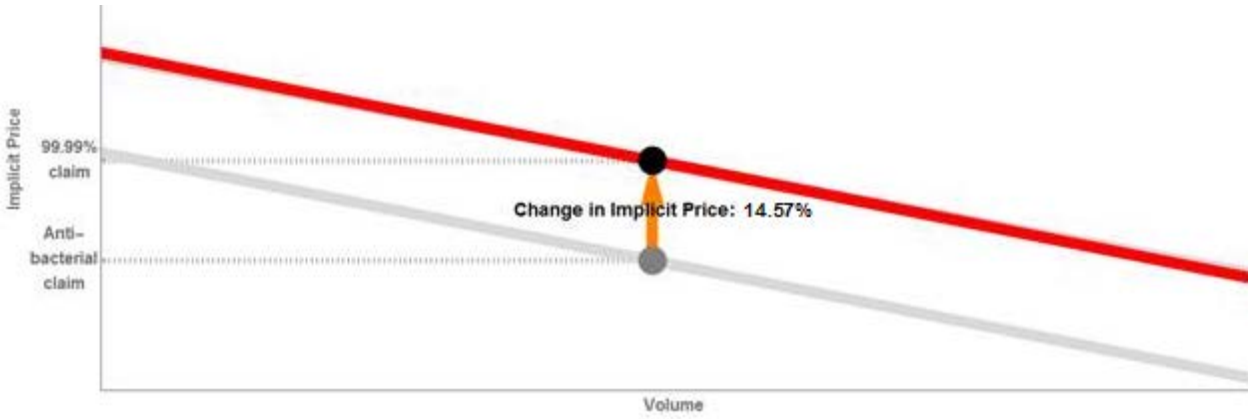


Figure 14: Percent Shift in Demand Curve and Drop in Equilibrium Implicit Price When Comparing Product with 99.99% Germ-Killing Claim to Product with Antibacterial Claim (Simulation 4)



100. The computations underlying the illustrative example for one base product and one price point show that the relative price premium for the "kills 99.99% of germs" is approximately 14.57% (42 cents divided by $2.88). I performed the same computations underlying Figures 9-13 for over 900 combinations of product features and price points.

The following Table 1 shows the distribution of the relative price premium across all 900 simulated combinations:

Table 1:

	Percent Value Germ Claim						
	95%	***90%***	***75%***	***50%***	***25%***	***10%***	***5%***
Simulation 0	15.01%	14.19%	13.06%	11.74%	9.27%	8.43%	8.35%
Simulation 1	11.26%	11.20%	10.86%	10.81%	8.96%	8.14%	8.03%
Simulation 2	11.68%	11.62%	11.33%	11.29%	9.08%	8.09%	7.96%
Simulation 3	11.23%	11.07%	10.71%	10.28%	8.70%	7.93%	7.86%
Simulation 4	17.52%	17.06%	15.85%	14.57%	9.95%	8.49%	8.32%
Simulation 5	19.40%	19.03%	13.81%	12.67%	10.25%	8.91%	8.77%
Overall Distribution	***16.85%***	***15.29%***	***12.50%***	***10.89%***	***9.40%***	***8.23%***	***8.04%***

101. The results of the simulations presented in Table 3 indicate that the median of the distribution of price premiums is 10.89%. Further, 50% of all simulation results fall within Quartile 1 and Quartile 3 or 9.4% and 12.5%, which is a very tight range.

102. The results from the simulations further indicate that the relative price premium is slightly higher when the base products are either at the lower end of the simulated price range or at the upper end of the simulated price range.[39]

103. The fact that the simulations always resulted in a positive price premium for the "kills 99.99% of germs" claim indicates that consumers who purchased the product with this claim placed extra value on this claim which represents their loss from purchasing the product with the claim that was proven to be false. The median value of

[39] The complete simulation calculations and results can be found in the Appendix.

10.89% of the distribution of all simulations for the premium percentage is a reliable estimate that can be used to derive class-wide economic losses by applying the median percentage of 10.89% to the overall revenue from the sales of liquid hand soap products that were sold with the false claim. Based on sales summaries I have reviewed the median premium percentage is well below the gross margin that Dial realized by selling the product with the false claim.

9 Summary and Conclusion

104. I applied the well-established scientific methodology of Mixed Logit modeling and Hierarchical Bayes Estimation to analyze the data from an efficiently designed Conjoint Analysis. The results from the Conjoint Analysis can be relied upon to draw inferences about the value to customers of the claim that a product kills 99.99% of germs at the point of purchase and how such value will change when the claim is revealed to be false at the point of purchase.

105. The results from the Conjoint Analysis applied to extensive market simulations across a multitude of price points and base products with varying features described above indicate that consumers place an implicit price premium of approximately 10.89% on the claim that a product kills 99.99% of germs compared to a product that only claims to have antibacterial features a base product with no other added features.

106. Thus, the 10.89% represents the price premium solely attributable to Dial's claim on Dial Complete that Dial Complete "kills 99.99% of germs." All consumers paid this price premium when they purchased Dial Complete because it is a specific component of the total retail price of Dial Complete regardless of the actual retail price paid by the consumer.

107. Lastly, I conclude that the method proposed and described in this report can be used to expand the results of the conjoint study to a complete model to calculate class-wide damages in the merit phase of this case. For example, by multiplying the total revenue from all retail sales of products with the "kills 99.99% of germs" claim as determined in the analysis described above with the median relative price premium of

10.89%, I can calculate the total economic damages incurred by a class defined as all purchasers of Dial Complete products advertised with the attribute “kills 99.99% of germs”.

Respectfully submitted on June 20, 2016.

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